(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 17 June 2004 (17.06.2004)

PCT

(10) International Publication Number WO 2004/051225 A3

(51) International Patent Classification7: 49/40, 49/42, H01T 19/04

H01J 49/00,

(21) International Application Number:

PCT/US2003/038587

- (22) International Filing Date: 2 December 2003 (02.12.2003)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 60/430,223

2 December 2002 (02.12.2002)

- (71) Applicant: GRIFFIN ANALYTICAL TECHNOLO-GIES, INC. [US/US]; 3000 Kent Avenue, West Lafayette, IN 47906 (US).
- (71) Applicants and
- (72) Inventors: WELLS, James, M [US/US]; 3636 Redondo Drive, Lafayette, IN 47905 (US). PATTERSON, Garth, E. [US/US]; 802 S. Brackney, Brookston, IN 47923 (US).
- (74) Agent: HYTA, Robert, C.; Wells St. John, P.S., 601 W. 1st Avenue, Suite 1300, Spokane, WA 99201 (US).

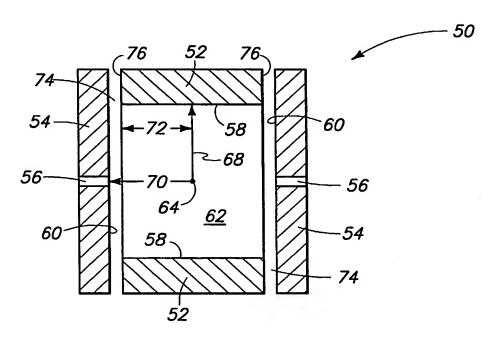
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU,

[Continued on next page]

(54) Title: PROCESSES FOR DESIGNING MASS SEPARATORS AND ION TRAPS, METHODS FOR PRODUCING MASS SEPARATORS AND ION TRAPS. MASS SPECTROMETERS, ION TRAPS, AND METHODS FOR ANALYSING SAMPLES



(57) Abstract: A mass separator and mass spectrometer comprising an ion trapping means (50) comprising a cylindrical electrode (52) and capping electrodes (54) having bores (56) therethrough for the controlled passage of ions.





WO 2004/051225 A3



ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

of inventorship (Rule 4.17(iv)) for US only

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 23 September 2004

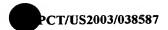
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/38587

US CL 2507281,282,284,285,286,287,288,396R,396ML According to International Pattern Classification (PCC) or to both national classification and IPC B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S.: 2507281,282,284,285,286,287,288,396R,396ML Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NONE C. DOCUMENTS CONSIDERED TO BE RELEVANT Category * Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. US 5, 685-529 B1 (SAKAIRI et al.) 30 September 395, Fig. 1, 4b, 5b-5c, 6, columns 10-13. A. B. US 4, 250, 884 A (SKAKAIRI et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns 11,7,9 13-16. A. US 4, 882, 484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. A. US 4, 54, 884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to column 8 line 55. ** Special categories of claud documents: "A.	A. CLASSIFICATION OF SUBJECT MATTER				
According to International Patent Classification (PC) or to both mational classification and IPC B. FIELDS SEARCHEED Minimum documentation searched (classification system followed by classification symbols) U.S.: 250/281,282,284,285,286,287,288,396R,396RL Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search (terms used) NONE C. DOCUMENTS CONSIDERED TO BE RELEVANT Category * Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A, E US 5,685,592 BI (SAKARIR et al.) 03 February 2004 (03.02.2004), Fig. 3 and 7, columns 10-13. A US 4,882,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. A US 4,882,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. A US 4,548,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to 1-67 Column 8 line 55. Further documents are listed in the continuation of Box C. ** Special casegories of clied documents: ** A Column and thinking the general state of the art which is not considered to be of particular references. ** Special casegories of clied documents: ** A Column 8 line 55. ** Special casegories of clied documents: ** Special casegories	IPC(7) : H01J 49/00,40,42; H01T 19/04				
Minimum documentation searched (classification system followed by classification symbols) U.S.: 250/281,282,284,285,286,287,288,396R,396RL Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NONE C. DOCUMENTS CONSIDERED TO BE RELEVANT Category ** Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A. E. US 5,686,592 B1 (SAKAIRI et al.) 03 February 2004 (03.02.2004), Fig. 3 and 7, columns 1-67 1-13-16. A. US 4,482,484 A (BIER et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns 1.7,9 1-3-16. A. US 4,480,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. A. US 4,540,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to column 8 line 55. The document which may threw deaths on crity claim(i) are which is toled to expect files the subleaden date of another unifor or other special reasons (as specifical). The document which may threw dates on criterion of the international filing date to release specifical on the contribution or other special reasons (as specifical). The document which may threw dates on criterion of the international filing date to release the document is claimed invention cannot be extent application that it is the an one disconting to the international filing date to the contribution of the international search The document which may threw dates on criterion the surface of the document is conclusioned to evolve an lovestive step when the document is claimed to evolve an invention cannot be considered to the conclusion of the contribution of the international search The document which may three deciments on considered to be concerned in evolve an invention cannot be considered in the state and one considered to be considered to evolve an inv					
U.S.: 250/281,282,284,285,286,287,288,396R,396ML Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NONE C. DOCUMENTS CONSIDERED TO BE RELEVANT Category* Clation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A, B US 6,686,592 B1 (SAKAIRI et al.) 03 February 2004 (03.02.2004), Fig. 3 and 7, columns 1.67 I.1-67 I.1-13. Y US 5,420,425 A (BIER et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns 1.7,9 I.3-16. A US 4,882,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-68 on column 5. A US 4,540,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to column 8 line 55. Further documents are listed in the continuation of Box C. See patent family annex. To document which may throw deads on, ority claim() or which is load to expectation. The document updicated or parent published on or after the international filing date or priority date and not no conditient to the application or passent published of priority date internation and filing date or other special reason (as spectful). The document which may throw deads on, ority claim() or which is load to expectful or decrease the document is considered to love on the conditient to the special cannot be considered to love on the conditient of the special continuation cannot be considered only which not extend to expect the document is about alone or other special reason (as spectful) or placed and not no conditient to the special continuation of the policial of the international filing date or other special reason (as spectful) and the policial of the conditient of bower and the comments is considered to love or name to the other conditient to be considered to love or name to the other conditient to love or name to the other conditient to love or name to					
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) C. DOCUMENTS CONSIDERED TO BE RELEVANT Category * Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A. E. US 6,686,592 BI (SAKAIRI et al.) 03 February 2004 (03.02.2004), Fig. 3 and 7, columns 10-13. Y. US 5,420,425 A (BIER et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns 1,7.9 13-16. A. US 4,822,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. US 4,840,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to column 8 line 55. See patent family annex. *** **A* document defining the general state of the art which is not considered to be of particular relevance **C* **C* **Special categories of clied documenss: **A* document defining the general state of the art which is not considered to be of particular relevance **C* **C					
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) C. DOCUMENTS CONSIDERED TO BE RELEVANT Category * Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A. E. US 6,686,592 BI (SAKAIRI et al.) 03 February 2004 (03.02.2004), Fig. 3 and 7, columns 10-13. Y. US 5,420,425 A (BIER et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns 1,7.9 13-16. A. US 4,822,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. US 4,840,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to column 8 line 55. See patent family annex. *** **A* document defining the general state of the art which is not considered to be of particular relevance **C* **C* **Special categories of clied documenss: **A* document defining the general state of the art which is not considered to be of particular relevance **C* **C					
C. DOCUMENTS CONSIDERED TO BE RELEVANT Category * Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A, E US 6,686,592 B1 (SAKAIRI et al.) 03 February 2004 (03.02.2004), Fig. 3 and 7, columns 167 10-13. Y US 5,420,425 A (BIER et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns 13-16. A US 4,882,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. A US 4,540,824 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to column 8 line 55. **Special categories of cited documents: "A* document defining the general state of the art which is not considered to be of particular relevance." "E" earlier application or patent published on or after the international filing date or enable the publication date of another intation or other special reason (as specified) "Cocument which may throw doubts on, crity claimfoy or which is clied to enable the publication date of another intation or other special reason (as specified) "O* document which may throw doubts on, crity claimfoy or which is clied to enable the publication date of another intation or other special reason (as specified) "O* document published prior to the international filing date but later date the "** "O* document published prior to the international filing date but later date the priority date claimed unvention eannot be considered only or particular relevance; the claimed another international search (as considered only or particular relevance; the claimed another international search (as considered only or particular relevance; the claimed another international search (as considered only or particular relevance; the claimed another international filing date but later date the publication device of particular relevance; the claimed another international filing of the international search report 14 A pril 2004 (14.04.2004) Name and mailing address of the ISA/US Commissioner, for Patens					
Category * Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. A, E US 6,686,592 B1 (SAKAIRI et al.) 03 February 2004 (03.02.2004), Fig. 3 and 7, columns 10-13. Y US 5,420,425 A (BIER et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns 1,7,9 13-16. A US 4,882,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. A US 4,540,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to column 8 line 55. * Special categories of claed documens: "A" document defining the general state of the art which is not considered to be of particular relevance decument defining of the patients of particular relevance in document which may throw doubts on a first the international filling date or priority date claimed or patients which may throw doubts on or other postal reason (as specified) "C" document which may throw doubts on or other preselal reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other preselal reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document is occurred to a constitution of the international filling date or priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Commissioner for Patents A US 4,882,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, 1-67 1-67 See patent family annex. **T" tater document application fath tribe international filling date or priority date claimed or which is clad to excellent the publication date of sancher union or other present search of particular relevance; the claimed union to conflict with the application but cited to understand the principle or	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NONE				
A, E US 6,686,592 BI (SAKAIRI et al.) 03 February 2004 (03.02.2004), Fig. 3 and 7, columns 1-67 10-13. Y US 5,420,425 A (BIER et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns 1,7,9 2-6,8,10-67 A US 4,882,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. A US 4,540,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to 1-67 column 8 line 55. * Special categories of clad documents: *A* document defining the general state of the art which is not considered to be of particular relevance *B* cartler application or patent published on or after the international filing date or priority are and not to considered to be certabilish the publication date of another testion or other special reason (as specified) *CO* document referrings to an oral disclosure, use, exhibition or other means *P* document published prior to the international search *P* document published prior to the international fling date but later than the priority date claimed *Date of the actual completion of the international search 14 April 2004 (14,04.2004) Name and mailing address of the ISA/US Commissioner for Patents *Authorized officer John R. Lee *John R. L	C. DOCUMENTS CONSIDERED TO BE RELEVANT				
A, E US 6,886,592 BI (SAKAIRI et al.) 03 February 2004 (03.02.2004), Fig. 3 and 7, columns [1-67] Y US 5,420,425 A (BIER et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns [1,7,9] 2-6,8,10-67 A US 4,882,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. A US 4,540,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to 1-67 * Special categories of clied documents: "A" document defining the general state of the art which is not considered to be of particular relevance "B" cartler application or patent published on or after the international filing date over or cannot be considered to establish the publication date of another tustion or other special reason (as specified) "C" document which may throw doubts on, ority claim(s) or which is led to establish the publication date of another tustion or other special reason (as specified) "C" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international fling date but later than the priority date claimed "C" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international fling date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT. Atm: ISA/US Commissioner for Patents A US 4,882,484 A (FRANZEN ISA/US A (10.00.2)			propriate, of the relevant passages	Relevant to claim No.	
Y US 5,420,425 A (BIER et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns 1,7,9 2-6,8,10-67 A US 4,882,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. A US 4,882,484 A (FRANZEN et al.) 10 September 1985 (10.09.1985), column 6 to 1-67 Purther documents are listed in the continuation of Box C. * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance. "E" earlier application or patent published on or after the international filing date or priority date and not to conflict with the application but cited to understand the principle or theory underlying the investions of particular relevance, the claimed invention cannot be considered novel or cannot be considered novel or cannot be considered to love the document is combined with one or more other such document is combined with one or more other such document is combined with one or more other such document is combined with one or more other such document means "P" document referring to an oral disclosure, use, exhibition or other means "P" document referring to an oral disclosure, use, exhibition or other means "P" document referring to an oral disclosure, use, exhibition or other means "P" document referring to an oral disclosure, use, exhibition or other means "P" document referring to an oral disclosure, use, exhibition or other means "P" document referring to an oral disclosure, use, exhibition or other means "P" document referring to an oral disclosure, use, exhibition or other means "P" document remember of the international filing date but later than the priority date claimed Date of the actual completion of the international search 10 AUG 2014 Name and mailing address of the ISA/US Authorized officer John R. Lee John R. Lee					
A US 4,882,484 A (FRANZEN et al.) 21 November 1989 (21.11.1989), Fig. 1 and 7, columns 5-6, especially lines 5-68 on column 5. A US 4,540,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to 1-67 * Special categories of cited documens: "A" document defining the general state of the art which is not considered to be of particular relevance of particular relevance artier application or patent publication act of another station or other special reason (as specified) "C" document which may throw doubts on , ority elaim(s) or which is cited to establish the publication date of another station or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document publicad or a oral disclosure, use, exhibition or other means "P" document publication of the international filing date but later than the priority date claimed invention cannot be considered to involve an inventive step when the document is taken alone to considered to involve an inventive step when the document is taken alone to considered to involve an inventive step when the document is combined with one or more other such documents; such combination being obvious to a person skilled in the art document is alone and the priority date claimed and the priority date of particular relevance; the claimed usernition cannot be considered to involve an inventive step when the document is combined with one or more other such documents; such combination being obvious to a person skilled in the art document is combined with one or more other such documents; and document is combined with one or more other such documents; and combination being obvious to a person skilled in the art document is combined with one or more other such documents; and document is combined with one or more other such documents; and document is combined with one or more other such documents; and document is combined with one	Y	10-13. US 5,420,425 A (BIER et al.) 30 May 1995 (30.05.1995), Fig. 1, 4b, 5b-5c, 6, columns		1,7,9	
columns 5-6, especially lines 5-68 on column 5. US 4,540,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to Further documents are listed in the continuation of Box C. Special categories of clied documents: "T" A" document defining the general state of the art which is not considered to be of particular relevance "E" cartier application or patent published on or after the international filing date or priority date and not in conflict with the application but circl to understand the principle or theory underlying the invention cannot be considered novel or cannot be considered to levolve an inventive step when the document is aken alone "C" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Atm: ISA/US Commissioner for Patents P.O. Box 1457 Authorized officer John R. Lee See patent family annex. "T" later document published after the international filing date or priority date and not in conflict with the application but circle to understand the principle or theory underlying the invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined who are more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family The priority date claimed Date of mailing of the international search report 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Atm: ISA/US Commissioner for Patents P.O. Box 1457	A ·	13-16.		2-6,8,10-67	
See patent family annex.	A				
Further documents are listed in the continuation of Box C. * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "B" earlier application or patent published on or after the international filling date "L" document which may throw doubts on , ority claim(s) or which is cited to establish the publication date of another tunion or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop FCT, Attn: ISA/US Commissioner for Patents P. D. Roy 1459 See patent family annex. "T" later document published after the international filling date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention cannot be considered note of cannot be considered to involve an inventive step when the document is combined with one or more other such documents such combination being obvious to a person skilled in the art document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention cannot be considered novel or cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents member of the same patent family document member of the same patent family and and not in conflict with the application but cited to understand the principle or theory underlying the invention cannot be considered novel or	A US 4,540,884 A (STAFFORD et al.) 10 September 1985 (10.09.1985), column 6 to		1-67		
Further documents are listed in the continuation of Box C. See patent family annex. "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on , ority claim(s) or which is cited to establish the publication date of another itation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailling address of the ISA/US Mail Stop PCT, Atm. ISA/US Commissioner for Patents P.O. Box 1450 Authorized officer John R. Lee See patent family annex. "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention cannot be considered novel or cannot be considered novel or cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is taken alone "Y" document	·	Column 6 line 33.	,		
*Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "B" earlier application or patent published on or after the international filing date "L" document which may throw doubts on , ority claim(s) or which is cited to establish the publication date of another special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P. O. Boy 1450 Authorized officer John R. Lee "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered to involve an invention cannot be considered to involve an invention cannot be considered to involve an invention cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered novel or cannot be considered to involve an invention cannot be considered to involve an invention cannot be considered to involve			•	٠,	
*Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "B" earlier application or patent published on or after the international filing date "L" document which may throw doubts on , ority claim(s) or which is cited to establish the publication date of another special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P. O. Boy 1450 Authorized officer John R. Lee "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered to involve an invention cannot be considered to involve an invention cannot be considered to involve an invention cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered novel or cannot be considered to involve an invention cannot be considered novel or cannot be considered novel or cannot be considered to involve an invention cannot be considered to involve an invention cannot be considered to involve		,			
*Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "B" earlier application or patent published on or after the international filing date "L" document which may throw doubts on , ority claim(s) or which is cited to establish the publication date of another special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P. O. Boy 1450 Authorized officer "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance; the claimed invention cannot be considered novel or cannot be considered novel or cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "A" document published prior to the international filing date but later than the principle or theory underlying the invention "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve					
*Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "B" earlier application or patent published on or after the international filing date "L" document which may throw doubts on , ority claim(s) or which is cited to establish the publication date of another special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P. O. Boy 1450 Authorized officer "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance; the claimed invention cannot be considered novel or cannot be considered novel or cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "A" document published prior to the international filing date but later than the principle or theory underlying the invention "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve					
*Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "B" earlier application or patent published on or after the international filing date "L" document which may throw doubts on , ority claim(s) or which is cited to establish the publication date of another special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P. O. Boy 1450 Special categories of cited documents: "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document published prior to the internation cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document published prior to the international filing date but later than the principle or theory underlying the invention of the considered to involve an inventive step when the doc					
date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document defining the general state of the art which is not considered to be of particular relevance "L" earlier application or patent published on or after the international filling date "L" document which may throw doubts on or ity claim(s) or which is cited to establish the publication date of another station or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P. O. Box 1450 John R. Lee document defining the general state of the art which is not considered to be of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family Date of mailing of the international search report 10 AUG 2004 Authorized officer John R. Lee John R. Lee	Further	documents are listed in the continuation of Box C.	See patent family annex.		
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on , ority claim(s) or which is cited to establish the publication date of another station or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patentis PO Roy 1450	* s	pecial categories of cited documents:	"T" later document published after the int	ernational filing date or priority	
"C" document which may throw doubts on or after the international filing date establish the publication date of another station or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P. O. Boy 1450			principle or theory underlying the invention		
establish the publication date of another station or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P. O. Boy 1450			considered novel or cannot be considered to involve an inventive step		
O document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Boy 1450	establish the publication date of another station or other special reason (as				
Date of the actual completion of the international search 14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Boy 1450 Date of mailing of the international search report 10 AUG 2004 Authorized officer John R. Lee					
14 April 2004 (14.04.2004) Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Boy 1450 Authorized officer John R. Lee	priority date claimed				
Name and mailing address of the ISA/US Mail Stop PCT, Atm: ISA/US Commissioner for Patents P.O. Boy 1450 Authorized officer John R. Lee					
Mail Stop PCT, Atm: ISA/US Commissioner for Patents P.O. Box 1450 John R. Lee			Authorized officer //		
P.O. Box 1450	Mail Stop PCT, Attn: ISA/US				
	P.O. Box 1450		•		
Facsimile No. (703) 305-3230 Form PCT/ISA/210 (second sheet) (July 1998)					



Box No. VIII (ii) DECLARATION: ENTITLEMENT TO APPLY FOR AND BE GRANTED A PATENT

The declaration must conform to the standardized wording provided for in Section 212; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No.VIII (ii). If this Box is not used, this sheet should not be included in the request.

Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent (Rules 4.17(ii) and 51bis.1(a)(ii)), in a case where the declaration under Rule 4.17(iv) is not appropriate:

Griffin Analytical Technologies, Inc. is entitled to apply for and be granted a patent by virtue of the following:

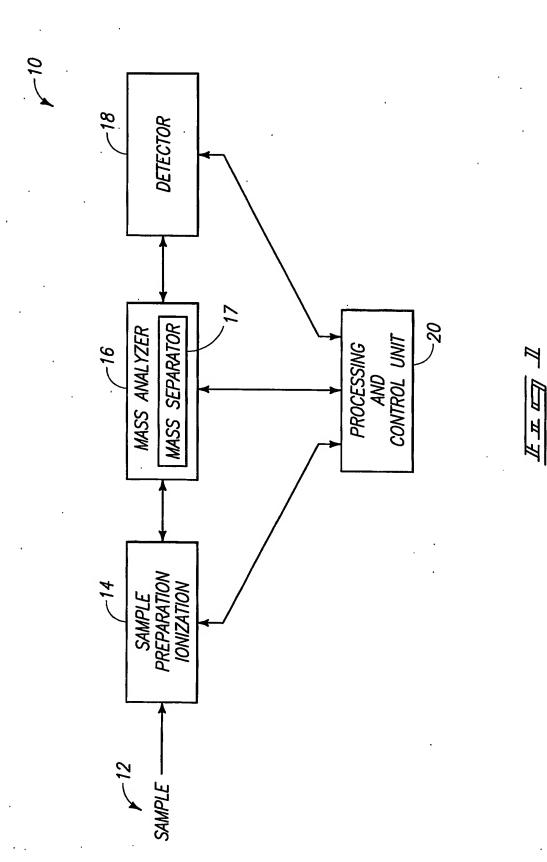
an assignment from:

WELLS, James Mitchell, 3636 Redondo Dr., Lafayette, IN 47905, United States of America, dated 09 February, 2004 (09.02.04); and

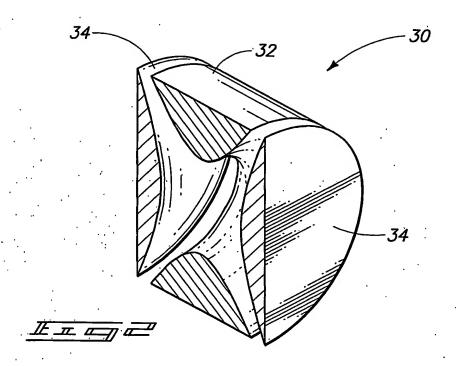
PATTERSON, Garth E., 802 S. Brackney, Brookston, IN 47923, United States of America, dated 09 February, 2004 (09.02.04).

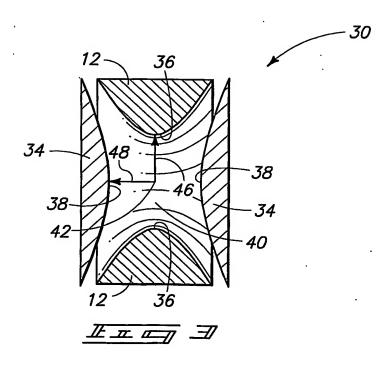
This declaration is made for the purposes of all designations.

This declaration is continued on the following sheet, "Continuation of Box No. VIII (ii)".

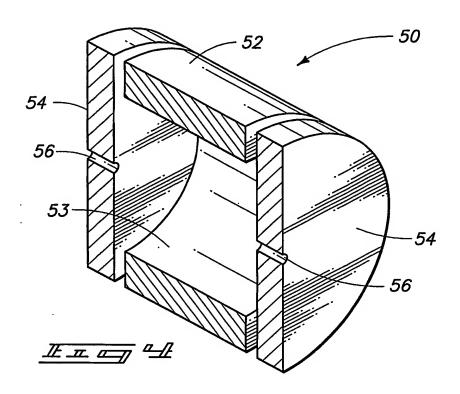


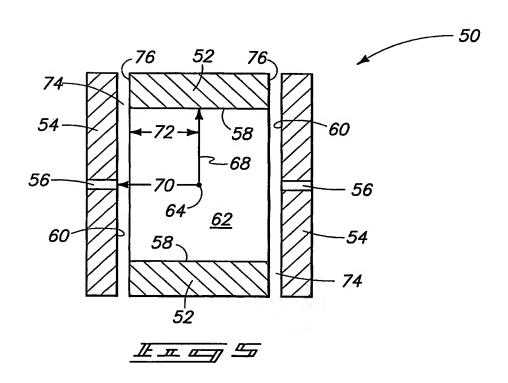
2/12



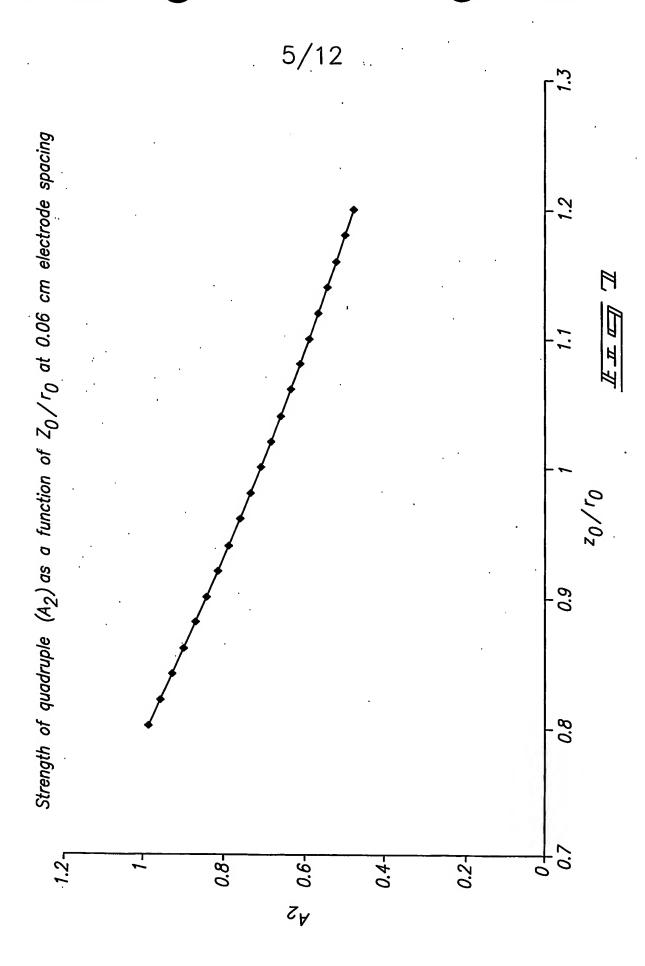


3/12

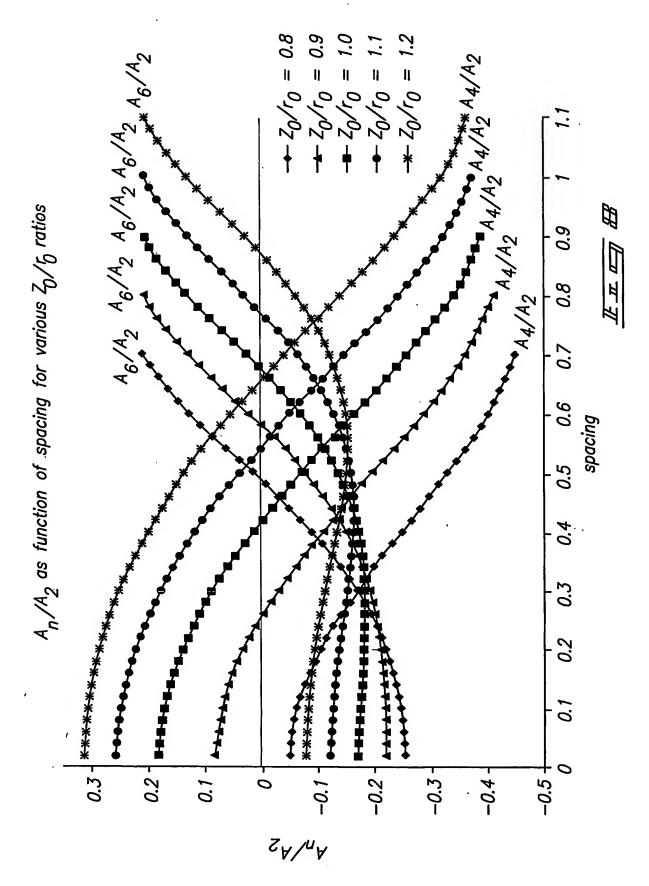




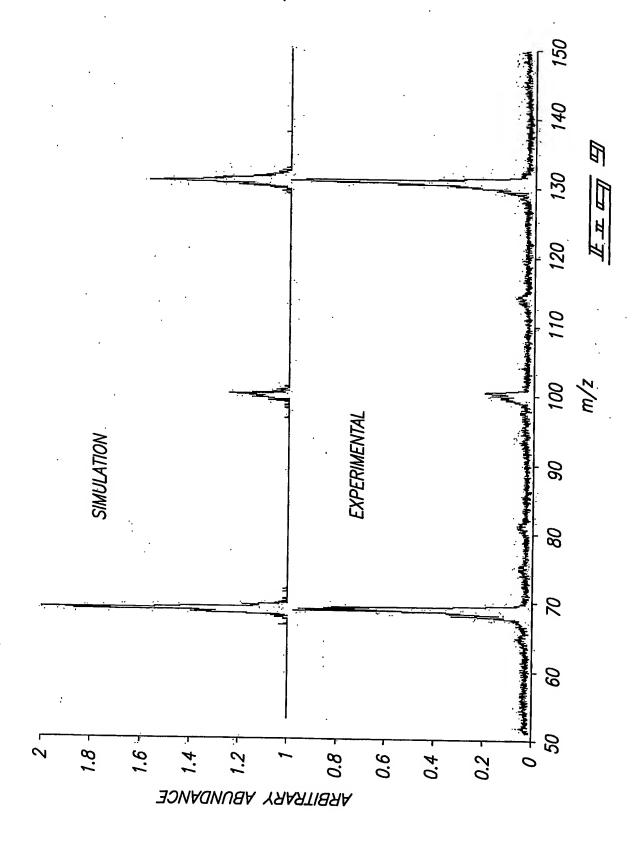
4/12 Strength of octapole relative to quadruple (A4/A2) as a function of Z_0/r_0 at 0.06 electrode spacing 0.9 0.8 0.35 J 0.2 -0.1 0.3 -0.05 --0.05 -0.25 -2A/4A 0.15-0



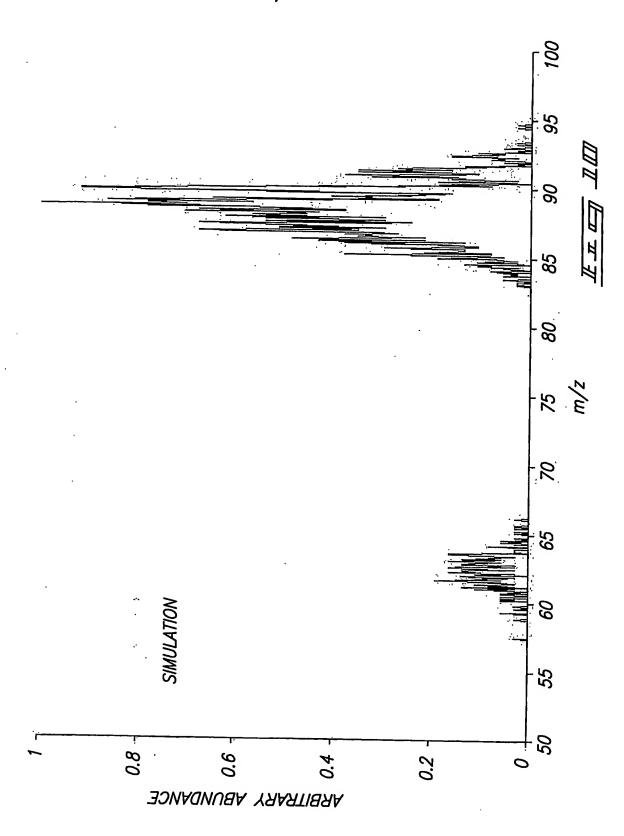




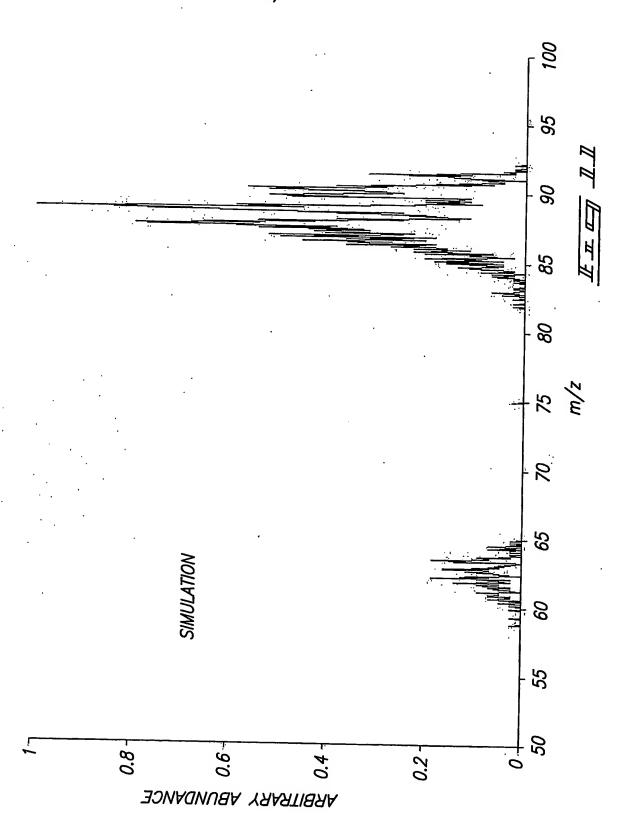




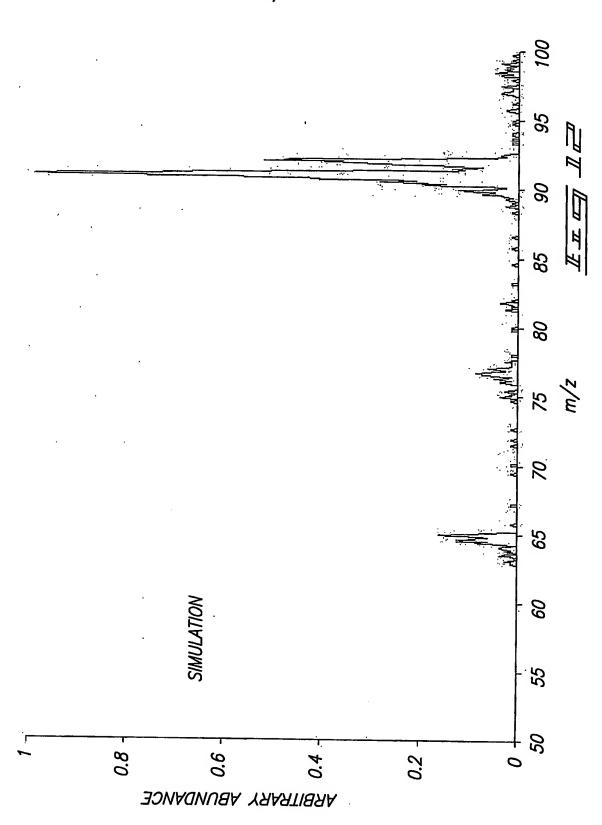
8/12



9/12



10/12



11/12

